

**INTRODUCTION**

Thank you for purchasing the SHARP Scientific Calculator Model EL-530V. This calculator will help you understand mathematical concepts behind fraction calculation, such as simplification and reduction.

After reading this manual, store it in a convenient location for future reference.

**Operational Notes**

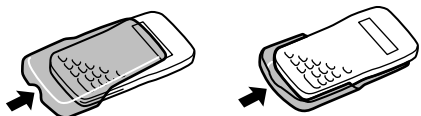
- Do not carry the calculator around in your back pocket, as it may break when you sit down. The display is made of glass and is particularly fragile.
- Keep the calculator away from extreme heat such as on a car dashboard or near a heater, and avoid exposing it to excessively humid or dusty environments.
- Since this product is not waterproof, do not use it or store it where fluids, for example water, can splash onto it. Raindrops, water spray, juice, coffee, steam, perspiration, etc. will also cause malfunction.
- Clean with a soft, dry cloth. Do not use solvents or wet cloth.
- Do not drop it or apply excessive force.
- Never dispose of batteries in a fire.
- Keep batteries out of the reach of children.
- This product, including accessories, may change due to upgrading without prior notice.

SHARP will not be liable nor responsible for any incidental or consequential economic or property damage caused by misuse and/or malfunctions of this product and its peripherals, unless such liability is acknowledged by law.

- ◆ Press the RESET switch (on the back), with the tip of a ball-point pen or similar object, only in the following cases. Do not use an object with a breakable or sharp tip. Note that pressing the RESET switch erases all data stored in memory.
  - When using for the first time
  - After replacing the batteries
  - To clear all memory contents
  - If an abnormal condition occurs and all keys are inoperative.

If service should be required on this calculator, use only a SHARP servicing dealer, SHARP approved service facility, or SHARP repair service where available.

**Hard Case**



**DISPLAY**

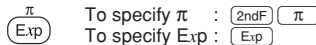


- All symbols will not be displayed simultaneously, as shown above.
- Certain inactive symbols may appear visible when viewed from a far off angle.
- ←/→ : Appears when the entire equation cannot be displayed. Press (←) / (→) to see the remaining (hidden) section.
- 2ndF** : Appears when (2ndF) is pressed, indicating that the functions shown in orange are enabled.
- SIMP** : Indicates that a fraction can be simplified further, or expressed with a lower denominator.
- STAT** : Appears when statistical mode is selected.
- M** : Indicates that a numerical value is stored in the independent memory.

**BEFORE USING THE CALCULATOR**

**Key Notation Used in this Manual**

In this manual, key operations are described as follows:



To access functions printed in orange above keys, press (2ndF) first.

In this manual, number entry examples are shown with ordinary numbers (i.e., "100" will be indicated instead of "1 0 0").

**Power On and Off**

Press (ON/C) to turn the calculator on, and (2ndF) (OFF) to turn it off.

**Clearing the Entry and Memories**

There are three clearing methods as follows:

Clearing operation	Entry (Display)	M*1	STAT, ANS*2
(ON/C)	○	×	×
(2ndF) (CA)	○	×	○
RESET	○	○	○

○ : Clear                      × : Retain

\*1 Independent memory M.

\*2 Statistical data and last answer memory.

- To clear the independent memory (M), press (ON/C) (STO).

**Entry and Correction of an Equation**

- Press (←) or (→) to move the cursor.  
To return to an equation after getting the answer, press (←) (→).
- To delete a number, place the cursor to the number to be deleted, then press (DEL).
- To insert a number, move the cursor to the place immediately after where the number is to be inserted, then enter the number.

## SCIENTIFIC CALCULATIONS

- Select the normal mode.
- In each example, press  $\text{ON/C}$  to clear the display before performing the calculation.

### Arithmetic Operations

$$12+16 \times 3 = \text{ON/C } 12 \text{ + } 16 \text{ } \times \text{ } 3 \text{ } = \quad \mathbf{60.}$$

$$350-120 \div 4 = 350 \text{ - } 120 \text{ } \div \text{ } 4 \text{ } = \quad \mathbf{320.}$$

$$72 \times (-12) - 150 = 72 \text{ } \times \text{ } (-) 12 \text{ - } 150 \text{ } = \quad \mathbf{-1014.}$$

$$(5+21) \times (30-16) = ( \text{ } 5 \text{ } + \text{ } 21 \text{ } ) \text{ } \times \text{ } ( \text{ } 30 \text{ } - \text{ } 16 \text{ } ) \text{ } = \quad \mathbf{364.}$$

$$(6 \times 10^3) \div (2 \times 10^{-4}) = ( \text{ } 6 \text{ } [ \text{Exp} ] \text{ } 3 \text{ } ) \text{ } \div \text{ } ( \text{ } 2 \text{ } [ \text{Exp} ] \text{ } (-) 4 \text{ } ) \text{ } = \quad \mathbf{3000000.}$$

### Constant Calculations

- In constant calculations, the addend becomes a constant. Subtraction and division are performed in the same manner. For multiplication, the multiplicand becomes a constant.
- After performing calculations using constants, on pressing  $\leftarrow$  ( $\rightarrow$ ) to edit an equation, the constants will be displayed as K.

$$245+60 = \text{ON/C } 245 \text{ + } 60 \text{ } = \quad \mathbf{305.}$$

$$12+60 = 12 \text{ } = \quad \mathbf{72.}$$

$$150-20 = 150 \text{ - } 20 \text{ } = \quad \mathbf{130.}$$

$$250-20 = 250 \text{ } = \quad \mathbf{230.}$$

$$200 \div 4 = 200 \text{ } \div \text{ } 4 \text{ } = \quad \mathbf{50.}$$

$$180 \div 4 = 180 \text{ } = \quad \mathbf{45.}$$

$$15 \times 3 = 15 \text{ } \times \text{ } 3 \text{ } = \quad \mathbf{45.}$$

$$15 \times 10 = 10 \text{ } = \quad \mathbf{150.}$$

### Functions

- For each example, press  $\text{ON/C}$  to clear the display.
- The results of inverse trigonometric functions are displayed within the following ranges:

$\theta = \sin^{-1}x, \theta = \tan^{-1}x$	$\theta = \cos^{-1}x$
$-90^\circ \leq \theta \leq 90^\circ$	$0^\circ \leq \theta \leq 180^\circ$

$$\sin 30^\circ = \text{ON/C } \sin \text{ } 30 \text{ } = \quad \mathbf{0.5}$$

$$\cos 60^\circ = \cos \text{ } 60 \text{ } = \quad \mathbf{0.5}$$

$$\tan 45^\circ = \tan \text{ } 45 \text{ } = \quad \mathbf{1.}$$

$$\sin^{-1} 0.5 = 2\text{ndF } \sin^{-1} \text{ } 0.5 \text{ } = \quad \mathbf{30.}$$

$$\cos^{-1} 0.5 = 2\text{ndF } \cos^{-1} \text{ } 0.5 \text{ } = \quad \mathbf{60.}$$

$$\tan^{-1} 1 = 2\text{ndF } \tan^{-1} \text{ } 1 \text{ } = \quad \mathbf{45.}$$

$$3^2 + 5^2 = 3 \text{ } [ 2\text{ndF} ] \text{ } X^2 \text{ } + \text{ } 5 \text{ } [ 2\text{ndF} ] \text{ } X^2 \text{ } = \quad \mathbf{34.}$$

$$8^3 = 8 \text{ } [ 2\text{ndF} ] \text{ } X^3 \text{ } = \quad \mathbf{512.}$$

$$\sqrt{32} + 3\sqrt{21} = \sqrt{\text{ } 32 \text{ } } + \text{ } 3 \text{ } [ 2\text{ndF} ] \text{ } \sqrt{\text{ } 21 \text{ } } = \quad \mathbf{8.415778426}$$

$$7^4 = 7 \text{ } [ 2\text{ndF} ] \text{ } y^x \text{ } 4 \text{ } = \quad \mathbf{2401.}$$

$$\frac{\pi}{3} = 2\text{ndF } \pi \text{ } \div \text{ } 3 \text{ } = \quad \mathbf{1.047197551}$$

$$15 + 8 \quad \text{ON/C } 15 \text{ } + \text{ } 8 \quad \mathbf{15+8}$$

$$\downarrow \quad \leftarrow \leftarrow \text{DEL} \text{DEL} \quad \mathbf{15}$$

$$15 - 3 \quad \text{ } - \text{ } 3 \quad \mathbf{15-3}$$

$$13 \times 24 = \text{ON/C } 13 \text{ } \times \text{ } 24 \text{ } = \quad \mathbf{312.}$$

$$\downarrow \quad \leftarrow \text{ } \rightarrow \quad \mathbf{13 \times 24}$$

$$15 \times 24 = \text{ } \rightarrow \text{DEL} \text{ } 5 \text{ } = \quad \mathbf{360.}$$

## Priority Levels in Calculation

This calculator performs operations according to the following priority:

- ① Functions expressed with numerical data placed before (such as  $x^2, x^3$ )
  - ②  $y^x, x\sqrt{y}$
  - ③  $\pi$
  - ④ Functions expressed with numerical data placed after (such as  $\sin, \cos$ )
  - ⑤ Multiplications with the sign “ $\times$ ” omitted from the front of a function (such as  $3\cos 20$ )
  - ⑥  $\times, \div$
  - ⑦  $+, -$
  - ⑧ Operations end commands (such as  $=, M+, \%, \text{DATA}, \text{CD}$ )
- A parenthesized calculation section has precedence over other sections of the calculation.

## INITIAL SETUP

### Mode Selection

Normal Mode:

Used to perform arithmetic operations and function calculations.

Statistical Mode:

Used to perform statistical operations. To enter statistical mode, press  $2\text{ndF}$   $\text{STAT}$ .  $\text{STAT}$  appears on the display to indicate that the statistical mode is selected. To return to normal mode, press  $2\text{ndF}$   $\text{STAT}$  with  $\text{STAT}$  on the display.  $\text{STAT}$  disappears as the calculator returns to normal mode.

- The mode will remain selected when the calculator is turned off.
- When executing mode selection, last answer memory will be cleared.

### Selecting the Display Notation and Decimal Places

This calculator has two display notation systems for displaying calculation results: floating point system and fixed decimal point system.

When the fixed decimal point system is selected, the number of decimal places can be set to any value between 0 and 9. The last decimal digit will be rounded off.

- Use  $2\text{ndF}$   $\text{FIX}$  to switch to the fixed decimal point system, press  $2\text{ndF}$   $\text{TAB}$ , then enter a value between 0 and 9 to set the decimal placement.
- The number will be displayed in scientific notation if the calculation results for floating point system does not fit in the following range:

$$0.000000001 \leq |x| \leq 9999999999$$

$$1 \div 3 = \text{ON/C } 1 \text{ } \div \text{ } 3 \text{ } = \quad \mathbf{0.33333333}$$

$$\rightarrow \text{ [Fixed decimal point] } 2\text{ndF } \text{FIX} \quad \mathbf{0.33333333}$$

$$\text{ [TAB set to 2] } 2\text{ndF } \text{TAB } 2 \quad \mathbf{0.33}$$

$$\rightarrow \text{ [Floating point] } 2\text{ndF } \text{FIX} \quad \mathbf{0.33333333}$$

$\frac{1}{4} + \frac{1}{5} =$	4	$\frac{1}{X}$	+	5	$\frac{1}{X}$	=	<b>0.45</b>
$200 \times 32\% =$	200	$\times$	32	$\frac{1}{X}$	$\%$	=	<b>64.</b>
$150 \div 300 = ? \%$	150	$\div$	300	$\frac{1}{X}$	$\%$	=	<b>50.</b>
$200 + (200 \times 32\%) =$	200	+	32	$\frac{1}{X}$	$\%$	=	<b>264.</b>
$300 - (300 \times 25\%) =$	300	-	25	$\frac{1}{X}$	$\%$	=	<b>225.</b>

## Random Function

This calculator has three random functions. Press **ON/C** to exit.

### Random Numbers

A pseudo-random number, with three significant digits from 0 up to 0.999, can be generated by pressing **2ndF** **RANDOM** **=**. To generate the next random number, press **=**.

### Random Integer

Integer number between 0 and 99 can be generated randomly by pressing **2ndF** **R.INT** **=**. To generate the next integer random number between 0 and 99, press **=**.

### Random Dice

To simulate rolling dice, integer number between 1 and 6 can be generated randomly by pressing **2ndF** **R.DICE** **=**. To generate the next integer random number between 1 and 6, press **=**.

## Memory Calculations

This calculator has two memory allocations: independent memory (M), and last answer memory (ANS). You will find them especially useful when combinations of calculations become complicated, or when applying the answer of previous calculation to another operations.

- Press **ON/C** **STO** to clear the independent memory ("M" symbol will disappear).
- After pressing **RCL** to recall a value stored in the memory, the value as displayed will be used in the calculation.

### Independent memory (M)

- STO** : Stores the result in the memory.
- RCL** : Recalls the value stored in the memory.
- 2ndF** **M+** : Adds the result to the value in the memory.

$30 + (3 \times 5) =$	<b>ON/C</b> 3	$\times$	5	<b>STO</b>	<b>15.</b> M			
$(3 \times 5) \times 4 =$	30	+	<b>RCL</b>	<b>=</b>	<b>45.</b> M			
$20 + 10 - 5 =$	<b>RCL</b>	$\times$	4	<b>=</b>	<b>60.</b> M			
$121 + 13 \times 2 =$	<b>ON/C</b> 20	+	10	-	5	<b>STO</b>	<b>25.</b> M	
$21 \times 3 - 16 =$	121	+	13	$\times$	2	<b>2ndF</b> <b>M+</b>	<b>147.</b> M	
(Total)	+	21	$\times$	3	-	16	<b>2ndF</b> <b>M+</b>	<b>47.</b> M
	<b>RCL</b>	<b>=</b>					<b>219.</b> M	
	<b>ON/C</b> <b>STO</b>						<b>0.</b>	

### Last answer memory (ANS)

When **=** is pressed, the calculation result will automatically be stored in the last answer memory.

**2ndF** **ANS** : Recalls the value stored in the last answer memory.

$4 \div 5 = 0.8 \dots (A)$	<b>ON/C</b> 4	$\div$	5	<b>=</b>	<b>0.8</b>				
$4 \times (A) + 60 \div (A) =$	4	$\times$	<b>2ndF</b> <b>ANS</b>	+	60	$\div$	<b>2ndF</b> <b>ANS</b>	<b>=</b>	<b>78.2</b>

## Chain Calculations

- This calculator allows the previous calculation result to be used in the following calculation.
- The previous calculation result will not be recalled after entering multiple instructions.
- In the case of utilizing postfix functions ( $\sqrt{\quad}$ , sin, etc.), you can perform a chain calculation even when the previous calculation result is cleared by the use of the **ON/C** or **2ndF** **CA** keys.

$6 + 4 =$ ANS	<b>ON/C</b> 6	+	4	<b>=</b>	<b>10.</b>
ANS + 5	<b>+</b>	5	<b>=</b>	<b>15.</b>	
$8 \times 2 =$ ANS	8	$\times$	2	<b>=</b>	<b>16.</b>
ANS <sup>2</sup>	<b>2ndF</b>	$X^2$	<b>=</b>	<b>256.</b>	
$44 + 37 =$ ANS	44	+	37	<b>=</b>	<b>81.</b>
$\sqrt{\text{ANS}}$	$\sqrt{\quad}$	<b>=</b>			<b>9.</b>

## Calculating the Highest Common Factor (H.C.F.) or Lowest Common Multiple (L.C.M.)

To calculate the H.C.F. or the L.C.M., the procedures are as follows:

What is the H.C.F. of 24 and 36?	<b>ON/C</b> 24	<b>2ndF</b> <b>H.C.F.</b>	36	<b>=</b>	<b>24.</b>
	<b>2ndF</b> <b>H.C.F.</b>	<b>=</b>			<b>24HCF36.</b>
	<b>=</b>				<b>12.</b>

What is the L.C.M. of 15 and 9?	<b>ON/C</b> 15	<b>2ndF</b> <b>L.C.M.</b>	9	<b>=</b>	<b>15.</b>
	<b>2ndF</b> <b>L.C.M.</b>	<b>=</b>			<b>15LCM9.</b>
	<b>=</b>				<b>45.</b>

- "Highest Common Factor" is synonymous with "Greatest Common Factor", "Lowest Common Multiple" is with "Least Common Multiple".

## Calculating quotient and remainder

**INT÷** : Calculates the quotient and remainder.

$23 \div 5$	<b>ON/C</b> 23	<b>2ndF</b> <b>INT÷</b>	5	<b>=</b>	<b>23÷5.</b>
(R: Remainder)	<b>=</b>				<b>4.</b>
$9.5 \div 4$	9.5	<b>2ndF</b> <b>INT÷</b>	4	<b>=</b>	<b>9.5÷4.</b>
	<b>=</b>				<b>2.</b>
$-32 \div (-5)$	<b>(-)</b> 32	<b>2ndF</b> <b>INT÷</b>	<b>(-)</b> 5	<b>=</b>	<b>-32÷-5.</b>
	<b>=</b>				<b>6.</b>

- Pressing **INT÷** cannot be followed by pressing a key for another operation such as (+, -,  $\times$ ,  $\div$ ), otherwise an error will result.
- The calculator can display a quotient or remainder up to 5 digits in length, including the "-" sign. If numbers longer than 5 digits are entered, normal division is performed.

## FRACTION CALCULATIONS

### Entering Fractions

- To enter fractions, use the following keys:

**X/Y** : Places the symbol "/" between the numerator and the denominator.

**UNIT** : Separates the integer (whole number) part from the fractional part of a mixed number.

$$\frac{2}{3} = \text{ON/C } 2 \text{ (X/Y) } 3 \text{ (=)} \quad 2/3$$

$$\frac{41}{2} = \quad 4 \text{ (UNIT) } 1 \text{ (X/Y) } 2 \text{ (=)} \quad 4.1/2$$

• Up to 10 key strokes, including “\_” and “/”, can be used to enter a fraction.

### Calculating with Fractions

Fractions can be incorporated into an arithmetic calculation. The “**SIMP**” symbol will appear with a calculation result if the answer can be further simplified. Refer to the following section of this manual for details.

$$\frac{1}{2} + \frac{1}{3} = \text{ON/C } 1 \text{ (X/Y) } 2 \text{ (+) } 1 \text{ (X/Y) } 3 \text{ (=)} \quad 6/12$$

$$\frac{2}{5} \times \frac{1}{3} = \quad 2 \text{ (X/Y) } 5 \text{ (X) } 1 \text{ (X/Y) } 3 \text{ (=)} \quad 2/15$$

### How to Simplify a Fraction

#### Reducing to its simplest form

If the result of pressing [=] is displayed with the “**SIMP**” symbol, the calculation can be reduced further. Use the [SIMP] key to set the factor of the fraction to simplify, either automatically or manually.

[Automatic Simplification]

$$\frac{1}{3} + \frac{2}{12} = \text{ON/C } 1 \text{ (X/Y) } 3 \text{ (+) } 2 \text{ (X/Y) } 12 \text{ (=)} \quad \text{SIMP } 6/12$$

[SIMP] FACTOR? SIMP  
[=] \*6\_ SIMP  
[=] **1/2**

\* If you do not know a common factor, press [=]. The greatest common factor “6” will be displayed.

[Manual Simplification]

$$\frac{1}{3} + \frac{2}{12} = \text{ON/C } 1 \text{ (X/Y) } 3 \text{ (+) } 2 \text{ (X/Y) } 12 \text{ (=)} \quad \text{SIMP } 6/12$$

[SIMP] FACTOR? SIMP  
2 [=] \* SIMP **3/6**  
[SIMP] 3 [=] **1/2**

\* “2” is entered as a factor, and “**SIMP**” will be displayed to indicate further simplification of the fraction is possible. If the entered value is not a common factor, the cursor will be set under the value. Press [DEL] to clear the value, then enter a correct common factor. Press [ON/C] to return to the “**FACTOR?**” display.

**Now that you have learned how to reduce a fraction to its simplest form, you can start using your calculator to perform fraction calculations quickly and efficiently.**

$$\frac{5}{6} + \frac{1}{14} = \text{ON/C } 5 \text{ (X/Y) } 6 \text{ (+) } 1 \text{ (X/Y) } 14 \text{ (=)} \quad \text{SIMP } 38/42$$

[=] \* **19/21**

\* If [=] is pressed instead of [SIMP], the number will automatically be reduced down to its simplest form with the greatest common factor.

#### Reducing to the lowest denominator

Prior to pressing the [=] key, a common denominator can be set to organize calculations.

$$\frac{1}{3} + \frac{1}{4} = \text{ON/C } 1 \text{ (X/Y) } 3 \text{ (+) } 1 \text{ (X/Y) } 4 \text{ (=)} \quad 1/3+1/4$$

[SIMP] DENOM.? SIMP  
48 [=] \* **16/48+12/48**  
[=] SIMP **28/48**

\* Enter a common denominator for the two fractions. If the entered value is not a common denominator, the cursor will be set under the value. Press [DEL] to clear the value, then enter a correct common denominator. Press [ON/C] to return to the “**DENOM.?**” display.

**Now that you have learned how to reduce a fraction to its lowest denominator, you can start using your calculator to perform fraction calculations quickly and efficiently.**

$$\frac{1}{3} + \frac{1}{4} = \text{ON/C } 1 \text{ (X/Y) } 3 \text{ (+) } 1 \text{ (X/Y) } 4 \text{ (=)} \quad 1/3+1/4$$

[SIMP] DENOM.? SIMP  
[=] \* **12** SIMP  
[=] **4/12+3/12**  
[=] **7/12**

\* If [=] is pressed instead of a number entry, the lowest common denominator will automatically be displayed.

### Conversion from/to a Fraction

- [A<sup>0</sup>/C] : Converts a decimal or improper fraction to a mixed fraction.
- [A/B] : Converts a mixed fraction or decimal to an improper fraction. In some cases, a decimal may not be converted to a fraction.
- [A.xxx] : Converts an improper fraction or a mixed fraction to a decimal.

$$\frac{45}{6} = \text{ON/C } 4 \text{ (UNIT) } 5 \text{ (X/Y) } 6 \text{ (=)} \quad 4.5/6$$

→ [A.xxx] [A.xxx] **4.833333333**  
→ [A/B] [A/B] **29/6**

$$1 \div 3 = \quad 1 \text{ (÷) } 3 \text{ (=)} \quad 0.333333333$$

→ [A/B] [A/B] **1/3**

$$6 \div 5 = \quad 6 \text{ (÷) } 5 \text{ (=)} \quad 1.2$$

→ [A/B] [A/B] SIMP **12/10**  
→ [A/B/C] [A<sup>0</sup>/C] SIMP **1.2/10**  
→ [A.xxx] [A.xxx] **1.2**

$$1.25 + \frac{2}{5} = \quad 1.25 \text{ (+) } 2 \text{ (X/Y) } 5 \text{ (=)} \quad 1.65$$

→ [A/B/C] [A<sup>0</sup>/C] SIMP **1.65/100**  
[SIMP] [=] [=] **1.13/20**

## STATISTICAL CALCULATIONS

To enter the statistical mode, press [2ndF] [STAT]. The indicator symbol **STAT** will appear. The following statistics can be obtained:

- $\bar{x}$  : Mean of sample (x)
- $s_x$  : Standard deviation of sample (x)
- $\sigma_x$  : Population standard deviation of sample (x)
- $n$  : Number of samples
- $\Sigma x$  : Total number of samples (x)
- $\Sigma x^2$  : Sum of the squares of sample (x)

### Entering Data

To enter sample data, use the numeric keys and press [DATA] ([STO] key) after each value. To enter data with its frequency, use the numeric keys to enter the value, then press [FRQ] ([RCL] key), enter the frequency, then press [DATA].

## ERROR AND CALCULATION RANGES

### Errors

An error will occur if an operation exceeds the calculation ranges, or if a mathematically illegal operation is attempted. If an error occurs, pressing  $\leftarrow$  (or  $\rightarrow$ ) automatically moves the cursor back to the place in the equation where the error occurred. Edit the equation or press  $\text{ON/C}$  to clear the equation.

### Error Codes and Error Types

Syntax error (Error 1):

- An attempt was made to perform an invalid operation.  
Ex. 2  $\text{+}$   $\text{-}$  5  $\text{=}$

Calculation error (Error 2):

- The absolute value of an intermediate or final calculation result equals or exceeds  $10^{100}$ .
- An attempt was made to divide by 0.
- The calculation ranges were exceeded while performing calculations.

Depth error (Error 3):

- The available number of buffers was exceeded. (There are 8 buffers\* for numeric values and 16 buffers for calculation instructions).

\* 4 buffers in STAT mode.

Equation too long (Error 4):

- The equation exceeded its maximum input buffer (159 characters). An equation must be shorter than 159 characters.

### Calculation Ranges

- Within the ranges specified below, this calculator is accurate to  $\pm 1$  of the least significant digit of the mantissa. However, a calculation error increases in continuous calculations due to accumulation of each calculation error. (This is the same for  $y^x$ ,  $\sqrt[n]{\quad}$ , etc. where continuous calculations are performed internally.)

Additionally, a calculation error will accumulate and become larger in the vicinity of inflection points and singular points of functions.

- Calculation range:  $\pm 10^{99} \sim \pm 9.999999999 \times 10^{99}$  and 0.

If the absolute value of an entry or a final or intermediate result of a calculation is less than  $10^{-99}$ , the value is considered to be 0 in calculations and in the display.

Function	Dynamic range
$\sin x$ $\cos x$ $\tan x$	$\text{DEG} :  x  < 10^{10}$ $(\tan x :  x  \neq 90(2n-1))^*$
$\sin^{-1}x$ $\cos^{-1}x$	$ x  \leq 1$
$\tan^{-1}x$	$ x  < 10^{100}$
$y^x$	$\cdot y > 0 : -10^{100} < x \log y < 100$ $\cdot y = 0 : 0 < x < 10^{100}$ $\cdot y < 0 : x = n (0 <  x  < 1 : \frac{1}{x} = 2n-1, x \neq 0)^*$ , $-10^{100} < x \log  y  < 100$
$x\sqrt[y]{\quad}$	$\cdot y > 0 : -10^{100} < \frac{1}{x} \log y \leq 100 (x \neq 0)$ $\cdot y = 0 : 0 < x < 10^{100}$ $\cdot y < 0 : x = 2n-1 (0 <  x  < 1 : \frac{1}{x} = n, x \neq 0)^*$ , $-10^{100} < \frac{1}{x} \log  y  \leq 100$

Enter the data "7"

$\text{ON/C}$ $\text{2ndF}$ $\text{STAT}$	$\text{STAT}$	
$\text{2ndF}$ $\text{CA}$ 7		7
$\text{DATA}$	$n =$	1.*

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There are 13 students who scored 70 in the test, and 5 students who scored 50.

$\text{2ndF}$ $\text{CA}$ 70 $\text{FRQ}(\cdot)$ 13		<b>70, 13</b>
$\text{DATA}$	$n =$	<b>13.</b>
$\text{50}$ $\text{FRQ}(\cdot)$ 5		<b>50, 5</b>
$\text{DATA}$	$n =$	<b>18.</b>

- \* The number of samples for the entered data will be displayed.
- Entered data are kept in memory until  $\text{2ndF}$   $\text{CA}$  or  $\text{2ndF}$   $\text{STAT}$  are pressed. Before entering new data, clear the memory contents.
- If the number of the sample values exceeds 999,999,999 "n=" will not appear.
- When inputting a formula as a sample value with frequency, parenthesize the data.  
Example:  $(A \times B)$   $\text{FRQ}(\cdot)$  frequency  $\text{DATA}$

### Correcting Entered Data

Correction prior to pressing  $\text{DATA}$ :  
Delete incorrect data with  $\text{ON/C}$ .

Correction after pressing  $\text{DATA}$ :  
press  $\rightarrow$  to confirm the latest entry and press  $\text{2ndF}$   $\text{CD}$  to delete it.

### Calculating Statistical Quantities

Score	Number of Persons	$\text{2ndF}$ $\text{CA}$	$\text{STAT}$	
30	5	$\text{FRQ}(\cdot)$ 5 $\text{DATA}$		$n = 5.$
40	3	$\text{FRQ}(\cdot)$ 3 $\text{DATA}$		$n = 8.$
50	10	$\text{FRQ}(\cdot)$ 10 $\text{DATA}$		$n = 18.$
60	12	$\text{FRQ}(\cdot)$ 12 $\text{DATA}$		$n = 30.$
70	12	$\text{FRQ}(\cdot)$ 13 $\text{DATA}$		$n = 43.$
80	9	$\text{FRQ}(\cdot)$ 9 $\text{DATA}$		$n = 52.$
90	7	$\text{FRQ}(\cdot)$ 7 $\text{DATA}$		$n = 59.$
100	3	$\text{FRQ}(\cdot)$ 3 $\text{DATA}$		$n = 62.$
		$\text{2ndF}$ $\bar{x}$		<b>65.32258065</b>
		$\text{2ndF}$ $S_x$		<b>18.52935128</b>
		$\text{2ndF}$ $\sigma_x$		<b>18.37931358</b>
		$\text{2ndF}$ $n$		$n = 62.$
		$\text{2ndF}$ $\Sigma x$		$\Sigma x = 4050.$
		$\text{2ndF}$ $\Sigma x^2$		$\Sigma x^2 = 285500.$

- If both the resulting digits and the function name (such as  $\Sigma x =$ ) cannot be contained in the display, only the resulting value will be displayed; the function name will not be displayed.

### Statistical Calculation Formulas

$$\bar{x} = \frac{\Sigma x}{n}$$

$$s_x = \sqrt{\frac{\Sigma x^2 - n\bar{x}^2}{n-1}}$$

$$\sigma_x = \sqrt{\frac{\Sigma x^2 - n\bar{x}^2}{n}}$$

$$\Sigma x = x_1 + x_2 + \dots + x_n$$

$$\Sigma x^2 = x_1^2 + x_2^2 + \dots + x_n^2$$

(n: number of samples)

- In the statistical calculation formulas, an error will occur if:
- the absolute value of the intermediate result or calculation result is equal to or greater than  $1 \times 10^{100}$ .
  - the denominator is zero.
  - an attempt is made to take the square root of a negative number.

$x^2$	$ x  < 10^{50}$
$x^3$	$ x  < 2.15443469 \times 10^{33}$
$\sqrt{x}$	$0 \leq x < 10^{100}$
$x^{-1}$	$ x  < 10^{100} (x \neq 0)$

\* n: positive integers

## BATTERY REPLACEMENT

### Notes on Battery Replacement

Improper handling of batteries can cause electrolyte leakage or explosion. Be sure to observe the following handling rules:

- Replace both batteries at the same time.
- Do not mix new and old batteries.
- Make sure the new batteries are the correct type.
- When installing, orient each battery correctly as indicated in the calculator.
- The factory-installed batteries may be exhausted before they reach the service life stated in the specifications.

### When to Replace the Batteries

If the display has poor contrast or nothing appears on the display even when **(ON/C)** is pressed, it is time to replace the batteries.

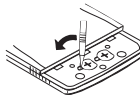
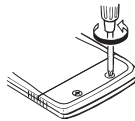
### Cautions

- Fluid from a leaking battery accidentally entering an eye could result in serious injury. Should this occur, wash with clean water and immediately consult a doctor.
- Should fluid from a leaking battery come into contact with your skin or clothes, immediately wash with clean water.
- If the product is not to be used for some time, to avoid damage to the unit from leaking batteries, remove them and store in a safe place.
- Do not leave exhausted batteries inside the product.
- Do not fit partially used batteries, and be sure not to mix batteries of different types.
- Keep batteries out of the reach of children.
- Exhausted batteries left in the calculator may leak and damage the calculator.
- Explosion risk may be caused by incorrect handling.
- Do not throw batteries into a fire as they may explode.

### Replacement Procedure

1. Turn the power off by pressing **(2ndF)** **(OFF)**.
2. Loosen both screws and remove the battery cover.
3. Replace the old batteries with new, with the positive (+) sides facing up.
4. Replace the battery cover and screws.
5. Press the RESET switch on the back.

- Make sure that the display appears as shown. Otherwise, remove the batteries, reinstall, and check the display again.



## Automatic Power Off Function

This calculator will turn its power off automatically if no key is pressed for about 10 minutes.

## SPECIFICATIONS

- Calculations:** General arithmetic operations (add, subtract, multiply, divide, operations with constants, memory operations, fraction operations, function operations, statistical operations, etc.)
- Internal calculations:** Mantissas of up to 12 digits
- Pending operations:** 16 calculations 8 numeric values (4 numeric values in STAT mode)
- Power source:** 3 V  $\approx$  (DC): Alkaline batteries (LR44)  $\times$  2
- Power consumption:** 0.0006 W
- Operating time:** Approx. 2000 hours, when continuously displaying 55555. at 25°C (77°F). May vary according to usage and other factors.
- Operating temperature:** 0°C – 40°C (32°F – 104°F)
- External dimensions:** 78.6 mm (W)  $\times$  144 mm (D)  $\times$  10.5 mm (H) 3-3/32" (W)  $\times$  5-21/32" (D)  $\times$  13/32" (H)
- Weight:** Approx. 68 g (0.15 lb) (Including batteries)
- Accessories:** Batteries  $\times$  2 (installed), operation manual, quick reference card and hard case.

## FOR MORE INFORMATION ABOUT SCIENTIFIC CALCULATOR

Visit us on the Internet at: <http://sharp-world.com/calculator/>

This equipment complies with the requirements of Directive 89/336/EEC as amended by 93/68/EEC.

Dieses Gerät entspricht den Anforderungen der EG-Richtlinie 89/336/EWG mit Änderung 93/68/EWG.

Ce matériel répond aux exigences contenues dans la directive 89/336/CEE modifiée par la directive 93/68/CEE.

Dit apparaat voldoet aan de eisen van de richtlijn 89/336/EEG, gewijzigd door 93/68/EEG.

Dette udstyr overholder kravene i direktiv nr. 89/336/EEC med tillæg nr. 93/68/EEC. Quest'apparecchio è conforme ai requisiti della direttiva 89/336/EEC come emendata dalla direttiva 93/68/EEC.

Η εγκατάσταση αυτή ανταποκρίνεται στις απαιτήσεις των οδηγιών της Ευρωπαϊκής Ένωσης 89/336/EOK, όπως ο κανονισμός αυτός συμπληρώθηκε από την οδηγία 93/68/EOK.

Este equipamento obedece às exigências da directiva 89/336/CEE na sua versão corrigida pela directiva 93/68/CEE.

Este aparato satisface las exigencias de la Directiva 89/336/CEE, modificada por medio de la 93/68/CEE.

Denna utrustning uppfyller kraven enligt riktlinjen 89/336/EEC så som kompletteras av 93/68/EEC.

Dette produktet oppfyller betingelsene i direktivet 89/336/EEC i endringen 93/68/EEC.

Tämä laite täyttää direktiivin 89/336/EEC vaatimukset, jota on muutettu direktiivillä 93/68/EEC.

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